ABSTRACT OF THE DISCLOSURE

A method for arithmetic expression optimization comprises validating at least one input stack associated with a first instruction operable on at least one operand of a first type and optimizing the first instruction to a second instruction operable on at least one operand of a second type that is smaller than the first type based at least in part on the relative size of the first type and the second type. The method also comprises matching the second type with an operand type of at least one operand in the at least one input stack associated with the second instruction. The matching comprises changing the type of instructions in a chain of instructions to equal the second type if the operand type is less than the second type. The chain is bounded by the second instruction and a third instruction that is the source of the at least one operand.